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Some Promising Early Maturing Exotic Collections of Cowpea Germplasm

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Abstract: Attempts have been made to augment and characterise the exotic germplasm of cowpea (*Vigna unguiculata* L.) under rainfed conditions. Large variability was recorded in various parameters. Few accessions, with desirable traits of early maturity, bold seeds and high yield have been identified.

Key words: Cowpea, grain type, variability.

Morphological diversity in cowpea (*Vigna unguiculata* (L.) Walp. Syn. *V. sinensis* (L.) Savi ex Hassk) and its physiological basis have been studied intensively in both the controlled and field conditions. Enough work has also been undertaken to improve the yield and nutritional quality of cowpea (Pal *et al.*, 1956; Singh *et al.*, 1976). However, further improvement by selection and breeding is still possible through fuller exploitation of available diversity and variability in germplasm (Chakraborty, 1986).

Several indigenous and exotic lines have been collected and catalogued (Thomas *et al.*, 1981; Pant *et al.*, 1982) at the National Bureau of Plant Genetic Resources (NBPGR), New Delhi. The collection and characterisation activities were later expanded to encompass the arid and semi-arid regions of India, with an attempt to select some early maturing, high yielding, bold seeded and drought tolerant accessions for this region. After screening the germplasm for several years, it has been possible to identify certain accessions with desired traits like early maturity, white and bold seeds, and high yield. The range of variability exhibited by the exotic accessions and description of a few selected, very early maturing exotic accessions are enumerated.

Materials and Methods

The germplasm of cowpea introduced from various countries and received through NBPGR, New Delhi, was used and evaluated during 1991 (43 accessions) and 1994 (76 accessions) and seed multiplication (84 accessions) was carried out in 1997, in the field of the Regional Station, Jodhpur. Each accession was grown in a 4 m long single row plot with 50 x 20 cm spacing. The crop was raised under rainfed conditions following usual cultural practices. Three plants from each of the row plots were randomly selected for recording data on various morphological and reproductive traits, viz., days taken to first and mean flowering and maturity; plant height, number of branches per plant, number of clusters and pods on main stem and branches, pod length, number of seeds per pod, seed weight per plant and 100-seed weight. The colour of flower, seed coat colour, seed hilum/eye colour and type of seeds were also noted. The data for individual plants were pooled and range, mean and standard deviation were calculated for the parameters.

Table 1. Range, mean and standard deviation for various morphological characters in cowpea evaluated in 1991 and 1994

Character	1991		1994	
	Range	Mean±SD	Range	Mean±SD
Days to mean flower	40-60	47.85±4.35	34-77	48.94±5.65
Days to mean maturity	54-90	63.47±32.50	48-85	71.32±5.46
Plant height (cm)	14-80	25.05±11.65	9-83	28.64±12.33
Branch number	1-10	5.62±1.62	1-12	5.12±1.78
Cluster on main shoot	1-18	3.08±2.83	1-13	4.23±2.96
Cluster on branches	1-18	6.47±3.75	1-29	7.23±4.15
Cluster on plants	1-34	9.62±5.56	1-36	9.48±5.94
Pods on main shoot	1-24	5.85±5.51	1-42	6.21±6.24
Pods on branches	1-30	11.92±7.42	1-48	10.62±7.91
Pods on plant	1-57	17.90±10.59	1-63	22.64±11.65
Pod length (cm)	5-22	13.47±2.98	8-26	14.21±4.65
Seed number per pod	4-24	12.98±3.16	5-20	13.16±4.12
Seed weight per plant (g)	2.5-48.9	18.21±9.30	1-87.7	23.61±21.60
100-seed weight (g)	4.7-19.7	10.03±2.23	5.2-20.1	10.76±3.50

Results and Discussion

There was considerable variability in the exotic cowpea germplasm for most of the traits studied in 1991 and 1994 (Table 1). Most of the accessions matured in 65-75 days. Some accessions took only 58-60 days to mature while others matured in 85-90 days. Mean branch number per plant was mostly 4 to 7 with a range value of 1-12 in both the years. Most of the accessions exhibited pod length of 9 cm (EC 57449) to 18 cm (EC 33830) with 10-17 seeds per pod (Table 1). Seed weight per plant was variable and ranged from 2.5 g (EC 101990) to 48.9 g per plant (EC 99566II) and 1 g (EC 101990) to 87.7 g per plant (EC 98688) in 1991 and 1994, respectively. Colour of the collections varied from white, yellow, brown, reddish brown, grey to black with even mottled or blotched colours. During characterisation, certain accessions with desirable traits were identified and selected. These early accessions mature in less than 60 days and some take 60-70 days to mature.

Some of the very early maturing grain type accessions (less than 60 days) with high seed yield are EC 101929 and EC109493-2010-1. These accessions are introductions from IITA, Nigeria, and are very early maturing with synchronous maturity. They have compact and bushy habit with dark green leaves. The erect pods are borne in clusters of 2 to 6 pods per cluster and are red to green in colour when fresh and turn brittle and brownish red on drying. The seed yield per row of 95 g for EC 101929 and 200 g for EC 109493-2010-1, with 100-seed weight of 6.75 and 8.08 g, respectively, recorded in 1997, make

Table 2. Exotic accessions with early maturity, bold seeds and high yield identified in 1991 and 1994

Accession number (EC)	Plant height (cm)	Mean seed yield per plant (g)	100-seed weight (g)	Seed color
33830	11.5	12.63	11.42	Brown
42720	15.9	22.61	11.40	Red brown
61395	22.3	23.46	15.12	Black
97749	25.6	15.83	10.99	Red brown
98688	26.41	36.12	12.63	Grey
99571	28.13	14.61	10.50	Brown
101916	39.20	19.40	12.88	Brown
101975	24.65	14.98	10.50	Brown
107135	27.83	9.63	12.93	Brown
107155	32.17	36.32	13.42	Red brown
107173	26.32	14.66	13.42	Red brown
107175	26.54	13.98	12.63	Red brown
107179	26.73	10.67	14.82	Red brown
110598	27.56	28.73	12.99	Red brown
367680*	20.34	19.81	10.02	White
367682*	24.56	10.12	15.12	White
367683*	25.13	7.29	14.22	White
367700*	23.00	9.31	11.07	Red
367713*	19.25	18.31	12.93	White

*Identified in 1997.

these accessions outstanding. The pod size, seed colour and seed size are comparable to the released variety G-2. Uniform pod formation and maturity are additional attributes of these accessions. EC 107183 and EC 107191 are the vegetable types. Both these accessions are introductions from USA and are very early maturing with uniform maturity. They are of bushy type, having plant height of 20 to 36 cm and 2 to 9 branches per plant. The pendant pods are light green in colour, soft and succulent, turning to pinkish yellow on drying in EC 107183. On the contrary, these are dark green succulent and fleshy, turning to brown on drying in EC 107191. The seeds of the former are medium sized, shining and reddish brown, while these are white and small in the latter. The seed yield per row of 165 g and 100-seed weight of 4.41 g for EC 107183 and 220 g and 6.74 g, respectively, for EC 107191 was recorded in 1997, make them comparable to the released variety Pusa Aseem.

Some other promising and early introductions with maturity of 60 to 70 days were identified in 1991 and 1994. Some of the most desired accessions are those with early maturity, bold and white coloured seeds (Table 2).

However, as evidenced, a great variability for several desirable characters is available in the exotic material, which have

not yet been exploited for use either as straight introductions or in breeding programmes.

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